Claims:

1. A composite beam which includes:

(a) a horizontal beam;

(b) a composite slab that is positioned on and supported by the beam; and

(c) a plurality of shear connectors, typically in the form of headed studs, embedded in the cast concrete and welded to the beam thereby to connect the composite slab to the beam; and

wherein the composite slab includes:

(i) profiled metal sheeting having pans and parallel ribs, with the sheeting positioned so that the ribs extend transversely to the longitudinal axis of the beam;

(ii) concrete cast on the sheeting; and

(iii) a reinforcing component embedded in the cast concrete, the reinforcing component including a plurality of reinforcing elements, with the reinforcing component being positioned so that the reinforcing elements intersect the conical-type failure surface or surfaces as described herein in at least two different directions.

2. The beam defined in claim 1 wherein the reinforcing elements extend a sufficient distance on both sides of each intersection point so that the elements are sufficiently well-anchored to develop tensile forces to prevent shear failure around the conical-type failure surface or surfaces.

3. The beam defined in claim 1 or claim 2 wherein the reinforcing elements extend a sufficient distance on both sides of each intersection point so that a similar failure surface cannot occur further away from the shear connectors.

4. The beam defined in any one of the preceding claims wherein the reinforcing component includes line wires and cross wires connected together at the intersections of the wires, with the line wires and the cross wires forming the reinforcing elements, and with the reinforcing component being positioned so that there are line wires and cross wires that have multiple points of intersection with the conical-type failure surface around each shear connector or groups of shear connectors in a pan.

5. The beam defined in any one of the preceding claims wherein the reinforcing component is in the form of a mesh that includes line wires and cross wires that are connected together at the intersections of the wires, with the line wires and the cross wires forming the reinforcing elements.

6. The beam defined in claim 4 or claim 5 wherein the reinforcing component is in the form of a mesh formed from line wires and cross wires that are connected together at wire intersections, with the line wires and the cross wires forming the reinforcing elements, with the line wires

having a zig-zag or " waveform" shape with peaks and troughs along at least part of the length of the line wires, and with the mesh positioned in relation to the ribs and pans of the profiled metal sheeting so that the cross wires are parallel to the ribs and are positioned in the pans and extend through the conical-type failure surface or surfaces, the peaks of the waveform line wires are positioned above the ribs, the troughs of the waveform line wires are positioned in the pans, and sections of the waveform line wires between the peaks and the troughs extend through the conical-type failure surface or surfaces.

7. The beam defined in any one of claims 1 to 3 wherein the reinforcing component is in the form of a bar chair designed to be positioned to protrude through the conical-type failure surface at multiple points.

8. The beam defined in any one of the preceding claims wherein the reinforcing component is positioned so that a substantial part of the transverse reinforcement is located between 10% and 75% of the height of the adjacent ribs.

9. The beam defined in any one of the preceding claims wherein the ribs are open ribs.